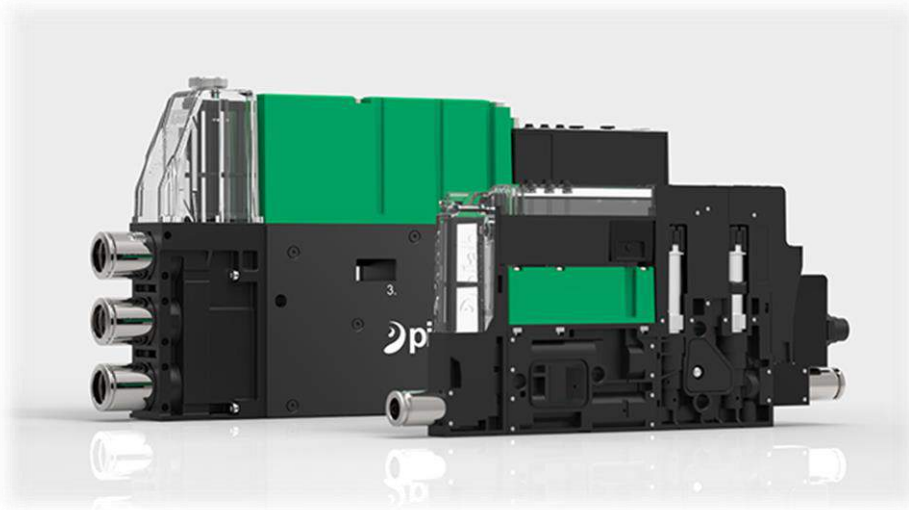


By Josef Karbassi, Vice President Automation Division, Piab

Maximised uptime with flexible all-in-one ejectors

As reliability and flexibility are the top priorities for manufacturers, Piab's new all-in-one vacuum ejector family offers reliability as a standard, not a premium, and can be tailored to suit any application.



***[piCOMPACT®](#) –
Eliminate vacuum
related downtime!***

Integrating controls such as valves, switches and sensors, all-in-one ejector units are compact and ideally suited for use in robotic applications and other space-constrained vacuum-based installations. However, the integration of such specialised functions and technologies has its pitfalls. If one part fails, the entire system fails. And if the system fails, the production stops.

Production interruptions due to failing systems are very expensive. No matter how energy efficient or fast a system is, if it is not reliable the costs will start to mount for the producer.

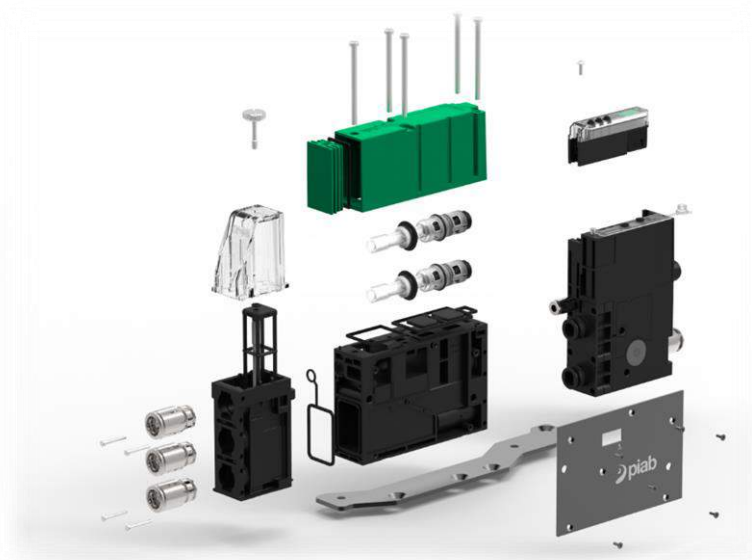
State-of-the-art details ensure reliability

A system is only as good as its parts, and in a complex system reliability is based on the assumption that all sub-units work perfectly, not just on their own but also together. For instance, it is notoriously difficult to maintain a steady voltage in a system made up of several power-draining sub-units. If the voltage level drops down too low a valve might fail to open or close. On the other hand, a sudden surge can result in the catastrophic loss of a sensitive vacuum switch or sensor.

Highly integrated and advanced systems require attention to detail and specialised expertise, which is why Piab decided to combine their expertise in vacuum technology with the expertise of market-leading specialists in valve, switch and sensor technology. This has enabled the company to design an all-in-one ejector unit based on state-of-the-art technology in all its details, ensuring maximum uptime for its users.

Configurable COAX®-based family offers flexibility

Based on Piab's multistage [COAX® technology](#), piCOMPACT® is a family of highly configurable ejector units, aimed at offering users maximum flexibility. The opportunity to choose from a wide variety of optional and/or customised pneumatic and electrical interfaces, valves, switches, and other features enables users to tailor the units to exactly suit their individual manufacturing requirements and budgets.



Paying only for the features and the capacity they really need, customers can make substantial savings. The family also includes ejectors of a broad performance range in order to suit a variety of systems, including those that require very low feed pressure or extra deep vacuum levels.

Units fit neatly into any space

Their compact and modular design also allows the ejector units to be integrated into existing production lines without the need for modifications, offering additional cost-savings. Flexible footprints and alternative number of inlets and outlets make it easy to fit units into space-constrained installations.



Designed as a stackable platform, within which ejector and valve sections can be separated, the [piCOMPACT® family](#) also enables several units to be mounted in the same manifold, where they can share common pneumatic and electrical connections. This modular and resource-sharing approach has the potential of saving customers not just money, but also installation time.



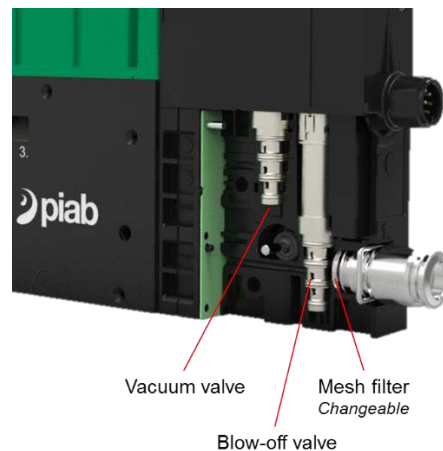
Integrating upgraded functions

In addition to Piab's compact and energy-efficient COAX® cartridges, the piCOMPACT® all-in-one units integrate essential controls and functions such as supply and release valves, as well as mechanical valves that regulate the flow of, for instance, the blow-off function. Also incorporated is an adjustable vacuum sensor that will signal to robots or manufacturing machines when the system has reached the required level of vacuum, or trigger a leakage warning. The sensor is also able to send analogue signals.



Employing direct operating valves, or valves in combination with durable and dirt-proof membranes, rather than the combination of pilot valves and dirt-sensitive poppet valves

used in competing units, the piCOMPACT® units have fewer moving parts, making them less susceptible to valve related issues.



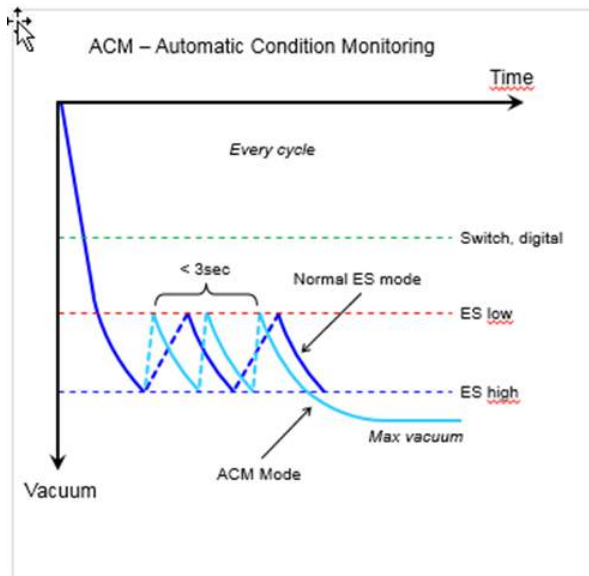
System reliability is also increased by the introduction of an adaptive version of the Pulse Width Modulation (PWM) technology used to control valves. PWM ensures that maximum power is used when valves are switching position, and reduces the power when valves are holding. However, voltage fluctuations from power supplies can jeopardise this control mechanism. The adaptive version implemented in Piab's units expands the allowed supply voltage range, +/-, whilst maintaining a safe level of holding voltage.

The use of cleanable vacuum filters with extra-large filter area is also helping to raise the bar for reliability.

Adding some special features

Piab has also equipped its piCOMPACT® family with some additional features. For instance, an optional and intelligent energy-saving function can effectively switch off the compressed air supply when a pre-set vacuum level is reached. Added to this are a couple of special automatic features, Automatic Condition Monitoring (ACM) and Automatic Level Determination (ALD).

The ACM automatically senses if energy-saving is needed or not, eliminating any problems with so called "motor-boating", which occur when the vacuum generator cycles on and off repeatedly due to leakage. This allows the ejector unit to be used for handling both leaking and sealed materials without the need for changed settings, adding extra flexibility. The ACM can also be used for monitoring when it is time to replace worn out suction cups or filters.



The ACM function checks the leakage by counting the amount of vacuum recoveries in a 3 second period.

≥ 2 recoveries the pumps starts and give max vacuum continuously.

< 2 recoveries the pumps continuous in normal ES mode.

ACM makes it possible to run different materials or quality of materials in the same application and in the same time eliminate noise "**Motorboating**" and extend lifetime of the vacuum valve.

Provides the "Leakage Warning Signal"

Based on analogue sensor technology, the ALD automatically measures the maximum achievable vacuum on an object in every cycle and sets an optimised energy-saving level. This results in the most reliable condition every time an object is handled.

Best-in-class reliability guaranteed

Enlisting the expertise of market-leading specialist companies, Piab has been able to incorporate the most advanced technology currently available. Vitally important and sensitive electronic sub-units such as vacuum sensors are based on components developed by a recognised expert in the field. Equally crucial valve technology has been acquired from a global manufacturer of state-of-the-art pneumatic valves and regulators.

Such expert attention to all parts included in the ejector units makes Piab confident enough to boldly promise a very high level of reliability. All moving parts have a guaranteed lifetime of 50 million cycles. This is 20 million cycles more than for any other all-in-one ejector unit on the market. However, Piab goes one step further than its competitors, also quoting a mean time before failure (MTBF) of 300 years. In essence, the company guarantees its customers best-in-class reliability.



Flexibility and reliability go hand in hand

The main applications for all-in-one ejector units are robotic materials handling systems or special purpose machines used within a variety of industries. Common to all of them is the need for reliable systems that guarantee maximum uptime for their operations.

Very often, all-in-one ejector units are fitted into existing production lines, and although they are compact, they also need to be sufficiently flexible and adaptable to enable hassle-free installation, and to make sure they fulfil their intended application or purpose.

By focusing on both reliability and flexibility when designing their piCOMPACT® ejector units, Piab has created all-in-one units that can be tailored to precisely meet the requirements of respective users. Their philosophy being that a truly flexible system will work better and hence be more reliable.

About Piab

Established in 1951, Piab designs innovative vacuum solutions that improve the energy-efficiency, productivity, and working environments of vacuum users around the world. As a reliable partner to many of the world's largest manufacturers, Piab develops and manufactures a complete line of vacuum pumps, vacuum accessories, vacuum conveyors and suction cups for a variety of automated material handling and factory automation processes. Piab utilizes COAX®, a completely new dimension in vacuum technology, in many of its original products and solutions. COAX® cartridges are smaller, more energy efficient and more reliable than conventional ejectors, and can be integrated directly into machinery. This allows for the design of a flexible, modular vacuum system. Piab is a worldwide organization with subsidiaries and distributors in almost 70 countries. Its headquarters are in Sweden. For more information about Piab vacuum solutions for a diverse range of applications, visit www.piab.com.